

## STEAM-CLEANING APPLIANCE

### **FIELD OF THE INVENTION**

The invention relates to a steam-cleaning appliance and, more particularly, the invention provides a steam-cleaning appliance that 5 operates according to water or coffee machine mode.

### **BACKGROUND OF THE INVENTION**

House furniture such as carpet and textile-based sofas need regular cleaning. In consideration of the material and size of those furniture elements, steam-cleaning appliances provide effective cleaning.

10 Steam-cleaning appliances that are presently sold typically operates according to the following manner. A metallic boiler is placed in the housing of the steam-cleaning appliance. When the user wants to use the steam-cleaning appliance, the user opens a cover of the housing to pour cold water in the boiler. The boiler then is electrically turned on to boil cold 15 water therein, thereby generating steam. This type of steam-cleaning appliance has at least the following inconveniences.

The user needs to wait a certain interval of time (about 5 to 10 minutes) before water effectively boils to produce steam. Steam can be therefore externally sputtered through a nozzle of the steam-cleaning 20 appliance without warning signal, hence potentially hurting the user not attentive. Moreover, after a certain time of utilization, the user needs to refill water in the boiler. The previous heating operation and waiting time is therefore repeated. To refill water, the user further needs to open the cover, steam pressure within the boiler is thus suddenly outputted, which may

5 easily hurt the user. Because the cover is usually designed with a reduced size to increase the heating time to boiling, steam pressure is therefore even more dangerously higher when the user opens the cover. Furthermore, the housing is usually made of plastics for lightweight consideration. To prevent a continuous heating of the boiler, a temperature sensor is typically mounted to control the turn on/off of the boiler. However, because the boiler generates heat to boil water and the boiling temperature cannot be precisely determined, steam therefore is sputtered in intermittence, which increases the danger of hurting the user.

10 **SUMMARY OF THE INVENTION**

It is therefore a principal object of the invention to provide a steam-cleaning appliance that overcomes the above disadvantages.

15 To accomplish the above and other objectives, a steam-cleaning appliance of the invention comprises a housing in which a water storage chamber, a pump, and a steam device are mounted. The pump pumps cold water from the water storage chamber and delivers cold water to the steam device. The steam device includes a water-flowing path and a heating unit that heats water flowing through the water-flowing path. Cold water pumped by the pump penetrates into the water-flowing path via a water 20 inlet to be heated. The increasingly heated water is sputtered into steam through a steam pipe to a nozzle of the steam-cleaning appliance.

With the above apparatus, the water storage chamber is not heated, the user thus can refill water without any danger. Furthermore, a multi-state controller mounted onto the nozzle allows the user to control the pump,

thereby the steam output of the nozzle can be selected to a continuous, 5 intermittence, or stop mode to obtain a convenient operation of the steam-cleaning appliance. Moreover, a temperature sensor is mounted at the location of the water inlet of the steam device that is at the lowest temperature. The heating unit can be thereby effectively controlled while preventing excessive heating temperature that may damages internal elements, and steam formation can be furthermore effectively ensured.

To provide a further understanding of the invention, the following detailed description illustrates embodiments and examples of the invention, 10 this detailed description being provided only for illustration of the invention.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

The drawings included herein provide a further understanding of the invention. A brief introduction of the drawings is as follows:

15 FIG. 1 is a perspective view of a steam-cleaning appliance according to an embodiment of the invention;

FIG. 2 is a schematic view showing the structure of a steam-cleaning appliance according to an embodiment of the invention;

20 FIG. 3 is a cross-section view of a steam-cleaning appliance according to an embodiment of the invention; and

FIG. 4 is a top view illustrating a steam device of a steam-cleaning appliance according to an embodiment of the invention.

## **DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Wherever possible in the following description, like reference numerals will refer to like elements and parts unless otherwise illustrated.

Referring to FIG. 1 through FIG. 4, various schematic views 5 illustrate a steam-cleaning appliance according to an embodiment of the invention. The steam-cleaning appliance principally comprises a housing 10 in which is mounted a steam device 30. Via the steam device 30 the flow and the amount of steam generated is controlled in the steam-cleaning appliance.

10 A water storage chamber 11 is mounted onto the housing 10 to receive cold water. The water storage chamber 11 may be formed with the housing 10 into one single body by, for example, stamping. A removable cover 12 is further mounted onto the water storage chamber 11 to allow the user to refill water therein. Within the housing 10, a pump 20 is arranged 15 on a positioning support 13 to pump cold water from the water storage chamber 11 via a pipe 5a.

The steam device 30 comprises a water-flowing path 31 and a heating unit 32 placed vis-à-vis the water flowing path 31 (the heating unit 32 is an electro-heating pipe). A water inlet 311 of the water-flowing path 20 31 is connected to the pump 20 via a pipe 5b. A water outlet 312 of the water-flowing path 31 is connected to the output of a nozzle 40 via a steam pipe 5c to deliver steam formed by heating of the cold water in the water-flowing path 31 by means of the heating unit 32. The water-flowing path 31 and the heating unit 32 are U-shaped, and are mounted onto each

other according to an opposite superposition. A temperature sensor 33 is arranged at the location of the water inlet 311 to control the turn on/off of the heating unit 32.

When the user wants to use the steam-cleaning appliance, he or she 5 first turns on a principal switch 14, externally placed on the housing 10 that controls the general electrical connection of the steam-cleaning appliance to a power supply. While holding the nozzle 40 toward the object to be cleaned, the user can switch a multi-state controller 41 on the nozzle 40 into various configurations to control steam output delivered by the pump 10 20. Continuous, intermittent, or stop configuration hence can be selected to control the steam output. Other controllers, for controlling for example the amount and flow of steam output, may be also available to let the user more functionality to control the steam output. Once the controller 41 turns on the pump 20, the pump 20 pumps cold water from the water storage 15 chamber 11. Cold water then passes through the pipes 5a, 5b to enter the water inlet 311 of the water-flowing path 31. The passage of cold water through the water inlet 311 is sensed via the temperature sensor 33 (the temperature sensor 33 is activated via a turn on of the principal switch 14 to sense the temperature of the water inlet 311). The temperature sensor 33 20 then outputs a signal that commands the activation of the heating unit 32 to heat cold water.

FIG. 2 illustrates an example of electrical connection to implement the above mechanism, in which the electrical terminals of both principal switch 14 and heating unit 32 are respectively connected to the electrical

terminals of the temperature sensor 33. The electrical connection of the different electrical terminals depends on the control relationship between the devices, which is known in the art and, therefore, omitted in this description.

5        Because both water-flowing path 31 and heating unit 32 are U-shaped and placed in opposite superposition, cold water starts to be heated once passing through the water inlet 311 to penetrate into the water-flowing path 31. While flowing through the water-flowing path 31, water is thereby continuously heated until being sputtered into steam via  
10      the water outlet 312. The steam is transferred to the nozzle 40 via the steam pipe 5c to be finally sputtered onto the object to be cleaned. Therefore, the user does not need to wait for the formation of steam by heating, and can efficiently control the amount of steam adapted to the cleaning of the object.

15      To prevent excessive external heating of the housing 10 and internal damages due to high heating temperature, the steam device 30 further includes a casing 34 that is externally covered with a thermal isolation element 35 (such as asbestos) and encloses the water-flowing path 31 and the heating unit 32. Additionally, a positioning pedestal 15 is arranged into  
20      the housing 10 to up set the steam device 30 and, thereby, maintain a distance between the steam device 30 and the housing 10. Heat generated by the heating unit 32 thus does not affect the housing 10. Moreover, the temperature sensor 33, controlling the turn on/off of the heating unit 32, is placed at the location of the steam device 30 that is subjected to the lowest

temperature, which is the water inlet 311 of the water-flowing path 31. As a result, the steam temperature can be controlled within a desired range, and a safe use can be thereby ensured.

It should be apparent to those skilled in the art that the above description is only illustrative of specific embodiments and examples of the invention. The invention should therefore cover various modifications and variations made to the herein-described structure and operations of the invention, provided they fall within the scope of the invention as defined in the following appended claims.

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